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The sensitivity of the bolometer was increased by the use of a thin nickel film on nitrocellulose leaves. It was thus possible to determine changes of the order of several millionths of a watt. More recently, non-metallic substances have been used as resistances because it was found that they showed greater changes of resistance due to heating than did the pure metal. This resulted in development of "thermistors." Nevertheless, in spite of many improvements made in construction of bolometers, their high inertia limits their use.

The application of Stolotov's photoeffect phenomenon has received wide application in high-speed indicators, television equipment, sound movies, and many other fields. But the very nature of the photoelement limits its field of use by requiring different types of photoelements for different wave bands. It has been suggested that the reason for lack of response by the apparatus in some regions of the infrared band is that the quantum of radiation energy is too small to release the electron from the photoelement in the vacuum. The most recent work has resulted in the manufacture of an apparatus which contains a photoelement with a cesium photolayer. This cesium photolayer has been processed with oxygen and is known as the oxygen-cesium-photoelement. Its sensitivity limits are 1.2 to 1.4  $\mu$  and its maximum sensitivity is in the vicinity of 0.8  $\mu$ .

It appears that subsequent research on photoelements should exploit the so-called internal photoeffect. This phenomenon is based on the theory that the conductance of some substances is increased when they are subjected to light. Such substances usually have a small number of conducting electrons, and are more popularly known as semiconductors.

Academician A. F. Ioffe is presently doing much work with semiconductors, and every day brings him and his school closer to solving the problem of semiconductors. It has been determined that the energy required to release an electron inside a substance as a result of absorption of radiation energy is less than the energy required to release an electron in a vacuum.

Oxygen acts very favorably on semiconductors, and there is a whole series of these substances which will become active only after being acted on by oxygen. The theoretical bases of this phenomenon were determined only very recently.

Today, scientists are interested in discovering more about the action of photoresistant materials manufactured from thallium sulfide (TlS) and lead sulfide (PbS). TlS, also known as "thalliofide," is sensitive to light waves of 1.4  $\mu$ , while PbS is sensitive up to 3.6  $\mu$ .

In conclusion, it must be mentioned that the efficiency of photoelements encased in a vacuum as well as photoelements manufactured from semiconductors is very low and at best is only some hundredths of a percent. But because of the achievements of contemporary science, and the excellent equipment for amplifying weak currents, infrared receivers occupy an important place in contemporary technology. It is only in those instances where it is necessary to register long-wave radiation that thermal receivers are used instead of photoelement receivers.

## BIBLIOGRAPHY

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